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AT THE FOREFRONT OF PROGRESS

THE AGRICULTURAL INDUSTRY OF MASSACHUSETTS AND ITS SIGNIFICANCE TO THE COMMONWEALTH

COLLEGE OF AGRICULTURE
UNIVERSITY OF MASSACHUSETTS

1863 CENTENNIAL 1963

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The University of Massachusetts is joining with 67 other institutions in observing the 100th anniversary of the Morrill Act which, in 1862, established the land-grant institutions of higher learning. In 1963, the University of Massachusetts will celebrate its own centennial year.

AT THE FOREFRONT OF PROGRESS is a joint publication of the Cooperative Extension Service and the Experiment Station, College of Agriculture, University of Massachusetts.

Professors George W. Westcott and Charles E. Eshbach, Department of Agricultural and Food Economics, University of Massachusetts, compiled the data and prepared the manuscript.

Basic to the welfare of Massachusetts and its many and varied industries is the agricultural industry, which dates back to the time when the first settlers reached our shores.

The agricultural industry has undergone many changes since those early days. It has changed as the sweep of expansion brought the plow to the great areas to the west. It has become specialized as increasing technology has made agriculture more complex. It has adapted itself to the economic and physical forces of the present century.

The agriculture of Massachusetts has continued to progress, to lead, and to succeed. It continues now to play a basic, dynamic, and essential role at the forefront of the economy of the Commonwealth.

The agricultural industry is vital to the continued prosperity of our state; it affects the everyday life of all who reside within the boundaries of Massachusetts as well as others living elsewhere. It produces food, provides jobs and incomes, and generates much business activity.

This publication has been designed to provide a picture of a highly modernized industry. It describes in word and picture what makes up the agricultural industry of Massachusetts, the place that it has in the economy, and the significance of the advances that science has made possible in this industry.

What is portrayed in these pages will enable the people of Massachusetts to recognize and understand better the significance of the agricultural industry to themselves and to the economy of the Commonwealth.

THE AGRICULTURAL INDUSTRY IS A MAJOR FACTOR IN THE ECONOMY OF MASSACHUSETTS

The agricultural industry of Massachusetts plays a vital and substantial role in the economy; every resident of the State has a stake in its progress. It uses large amounts of production materials and services, it creates jobs, it produces food and other agricultural products; and it is an object lesson for the rest of the country and the world in efficiency and successful adjustment to economic and social changes.

Today's highly commercialized Massachusetts agriculture stands in sharp contrast to the self-sufficient farming of Colonial days.

Then, most of the people lived on farms. They not only produced foods, but also with their own energy developed the facilities of production and did the food processing. Now a much smaller percentage of our population is needed to provide food for the residents of Massachusetts; and these include people both on and off the farms.

Today's farmers do not hew their equipment out of logs, burn lime for their fields, churn their own butter, butcher their meat, or make their own clothes. Equipment manufacturers, milk plants, packing plants, and countless other special businesses perform these services for them. Other specialized firms distribute their products to consumers.

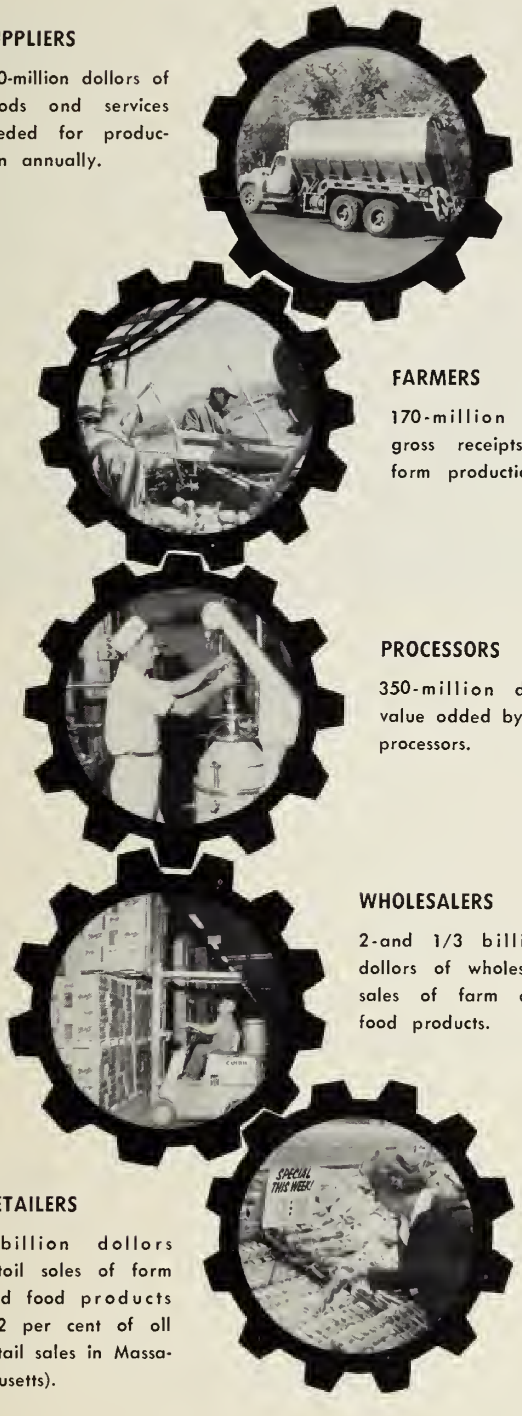
As a result, the agricultural industry now encompasses many operations and functions in both supply and distribution areas that at one time were performed on the farm.

Instead of the 90 per cent of the population required to produce food as in Colonial times, now only 9 per cent of our people are providing food for Massachusetts residents.

Many of this 9 per cent are in the off-the-farm part of the agricultural industry, performing services for farmers, and processing and distributing food for consumers. They are doing things that farmers used to do on the farm or close to it.

One per cent of our people now live on farms. They perform the herculean task of providing 17 per cent of the food needed by our population of more than 5 million — and they are producing as much or more food than ever before in the history of Massachusetts.

THE MASSACHUSETTS AGRICULTURAL INDUSTRY'S IMPACT ON THE STATE'S ECONOMY



SUPPLIERS

100-million dollars of goods and services needed for production annually.

FARMERS

170-million dollars gross receipts from farm production.

PROCESSORS

350-million dollars value added by food processors.

WHOLESALERS

2-and 1/3 billion dollars of wholesale sales of farm and food products.

RETAILERS

2-billion dollars retail sales of farm and food products (32 per cent of all retail sales in Massachusetts).

Many Firms Make Up Agricultural Industry

As recently as 30 years ago, farmers produced 70 to 80 per cent of the supplies they needed for farming and they bought only 20 to 30 per cent off their farms.

Today, farmers buy most of their supplies from commercial firms. These firms manufacture and distribute machinery, tractor fuels, fertilizers, mixed feeds, and thousands of other items.

Farmers combine these purchased supplies with land, labor, and their own managerial ability to produce food. They sell this food to business firms which assemble, transport, store, process, package, wholesale, and retail food products to consumers.

There is still more to this complex that makes up the Massachusetts agricultural industry. Credit, insurance, commodity grading and inspection, utilities, market and crop information, and research and educational assistance are examples of other services which are essential to modern agriculture.

Agriculture Is More Than Farming

Thus, agriculture in this modern time is more than farming. The business firms which manufacture and distribute farm production supplies, and the firms which market farm products, are as much a part of the agricultural industry as are the farmers who own and manage the farms.

The people on farms could not operate without these services. The firms could not continue their present businesses without the farms.

Agriculture, business, and consumers are closely inter-related and have become dependent upon each other.

MASSACHUSETTS FARMERS ARE . . .

Customers For Production Goods

The 11,000 farmers in Massachusetts are good customers every year for more than 100 million dollars worth of goods and services needed to produce crops and livestock.

Purchasers of Consumer Goods

They spend another 50 million dollars for consumer goods and services, such as food, clothing, drugs, furniture, appliances, health services, and recreation.

Providers of Jobs

They provide jobs and income — not only for people who supply the farmer, but also for those who market the farm products, and transport, store, process, and distribute the food needed by the State's 5 million consumers.

Massachusetts farmers spend millions of dollars annually for power machinery and equipment, fuels, lubricants, and maintenance.

Agriculture's Impact

Purchases, jobs, payrolls, dollars — all picture the impact of the Massachusetts agricultural industry on the economy of the Commonwealth.

A closer look at these evidences of economic activity and business operations emphasizes the significance of the Massachusetts agricultural industry to the state's economy.

Fertilizers and lime for Massachusetts farms are among the biggest supply items purchased annually by Bay State food producers.

Large stores meet the food needs of Massachusetts consumers with a wide variety of items from Massachusetts and other parts of the world.

Dollar Value of Purchases

Each year, purchases by Massachusetts farmers include:

- $35 to $40 million for commercial feeds for livestock.
- $12 to $15 million for power machinery and equipment.
- $5 to $6 million for fuel, lubricants, and maintenance of machinery and power equipment.
- $1 million for machine hire on a custom basis.
- $4 million for fertilizer for soils.
- $10 million for seeds, building materials, tools, and other miscellaneous items.
- $25 to $30 million for farm labor.

A total of 425 business enterprises, employing almost 3,000 people, with payrolls of more than 10 million dollars, are required to provide these products and supplies for Massachusetts farmers.

Assembly-line processing is characteristic of many operations in the Massachusetts agricultural industry.

Providing Vital Food

Massachusetts, as a large population center, long ago outgrew its farm output as the only source of food. There are now more than 22,000 firms in the state which assemble, process and distribute each year more than 1,500 pounds of food per capita. This includes not only the products from Massachusetts farms, but also food products from other parts of the United States and from foreign countries.

As the food assembly and processing center of the region, Massachusetts has:

- **Assembling and Wholesaling Farm and Food Products** — 19,000 employed with a payroll of 87 million dollars.
- **Processing Food** — 55,000 employed with a payroll of 205 million dollars.
- **Retailing Food and Providing Food Services** — More than 92,000 employed with a payroll of more than 200 million dollars.

Means Many Jobs

Employment is another way of indicating the economic significance of the agricultural industry to the economy of Massachusetts.

One out of every 11 jobs in private employment in Massachusetts is related to food and agriculture. A total of 165,000 people have jobs assembling our farm products, and transporting, storing, processing, and merchandising the food required by our people.

In the Food Processing Industry

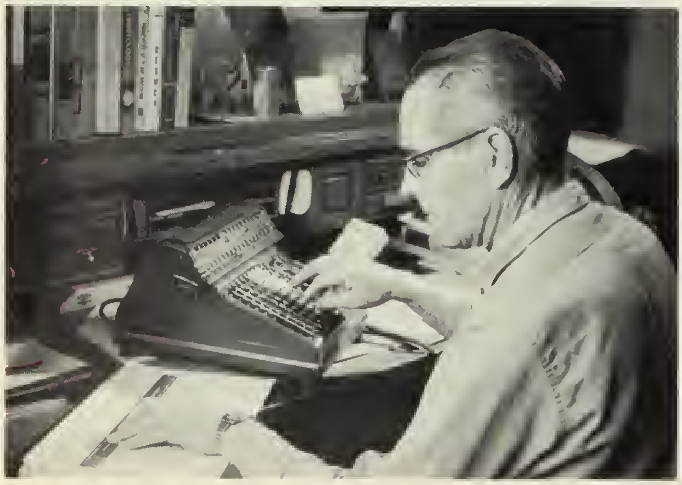
As an example, here are a few indications of the economic activity generated by the food processing industry of Massachusetts.

- **Meat and Poultry Products** — 6,000 employees and a payroll of 23 million dollars.
- **Dairy Products** — 10,000 employees and a payroll of 40 million dollars.
- **Canned and Frozen Foods** — 3,500 employees and a payroll of 11 million dollars.
- **Baking (including bread and related products)** — 12,000 employees and a payroll of 44 million dollars.

Complicated machinery transforms agricultural products into consumer food items.

Processing assembly lines transform agricultural products into popular food specialties.

Large-scale enterprises in the Massachusetts agricultural industry require much use of credit.



Modern business management practices are combined with scientific information.

In Total

There are approximately:

- 3,000 employees providing the goods and services needed by farmers.
- 17,000 people engaged in agricultural production on the farms.
- 165,000 employees assembling, processing, distributing, and servicing our food needs.

This adds up to 185,000 jobs, or nine per cent of all employment in Massachusetts.

The Agricultural Industry's Business

In terms of dollars, the contribution of the agricultural industry of the state can be measured in this way:

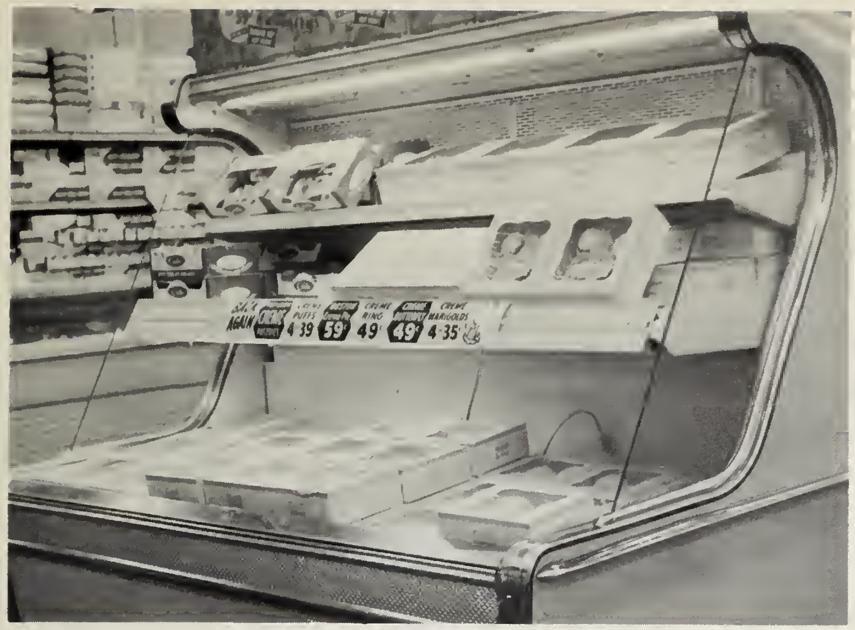
Gross receipts from farm production total almost 170 million dollars annually.

Value added by food processors is approximately 350 million dollars, or eight per cent of all value added in manufacturing in Massachusetts.

Sales by wholesalers of farm and food products total approximately 2 billion, 350 million dollars, or 27 per cent of all sales in wholesaling.

Sales of farm and food products to consumers at retail total 2 billion dollars, or 32 per cent of all retail sales in Massachusetts.

Large amounts of electric power are used in the production, processing and distribution of Massachusetts agricultural products.



Results of scientific progress are reflected in modern-day food store equipment and fixtures.

Vital in the distribution of food is its movement by truck from central warehouses to chain and independent retail food stores.

Many harvesting jobs are combined in the operation of large machines to reduce time and labor requirements.

AGRICULTURE IS A RAPIDLY-CHANGING INDUSTRY IN MASSACHUSETTS

Better, progressive, more efficient, keyed to the tempo of a modern age — these are the terms that describe the agricultural industry of Massachusetts, and there are plenty of statistics to prove it.

Productivity, technological progress, investment, labor requirements, and efficiency are indicators of the effects of change, and provide a good picture of what has happened to the agricultural industry over a period of time.

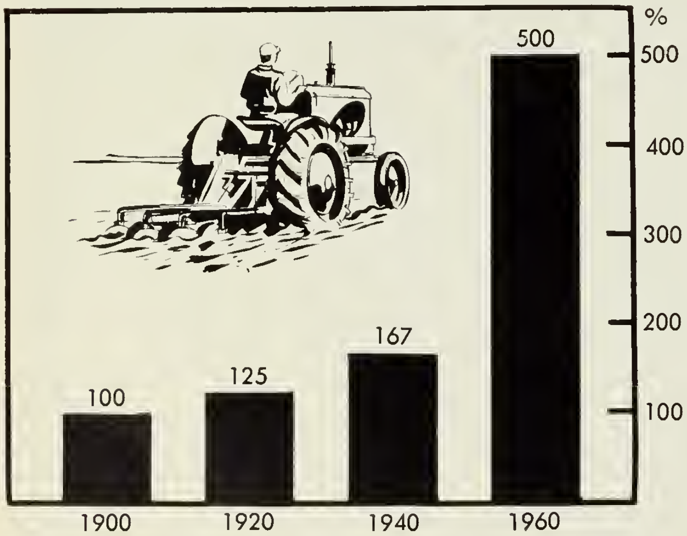
I. Increased Productivity

Consider first productivity — how much a worker produces for the time he spends at his job. On this score, farming has made great and continuing advances, and so have other parts of the agricultural industry.

Today, one farmer in Massachusetts produces as much as five did in 1900. The current productivity of Bay State farmers is four times greater than in 1920, and almost three times higher than in 1940.

This is comparable to the increased productivity of food retailing in which sales per worker have more than doubled in the past 25 years.

INCREASED PRODUCTIVITY PER FARM WORKER IN MASSACHUSETTS
Comparisons of 1920, 1940, and 1960 With 1900 Taken As 100% Base



Source: "Changes In Farm Production and Efficiency", Statistical Bulletin No. 233, United States Department of Agriculture, July 1960.

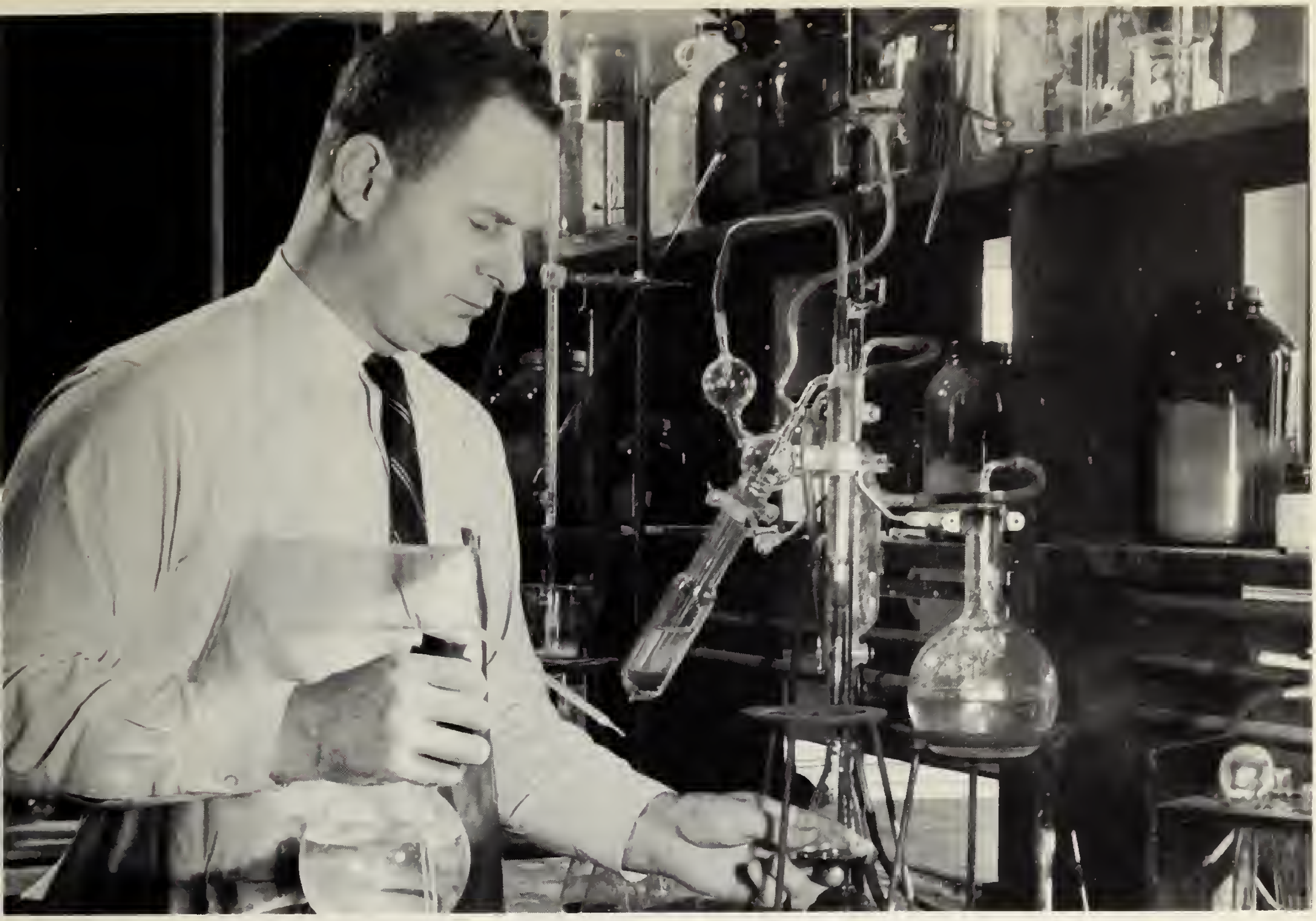
Complicated equipment performs a vital role in increasing the efficiency of food production.

II. Technological Innovation

Technological innovations on the farm made possible the advance in labor productivity. New sources of power such as electricity and rubber-tired tractors, new fertilizers, new materials for controlling pests, new varieties of plants, and new types of equipment for improving land are examples of the many technological developments that have boosted farm productivity.

These scientific advances have made it possible:

- To maintain farm production in Massachusetts during the past 60 years, while at the same time—
- Farm labor requirements were being reduced to one-fifth of former needs, the number of farms to one-third, and crop land to one-half its former acreage.



Scientific discoveries in agricultural research laboratories provide new and more efficient methods to produce, process and distribute food.

In the food retailing business many new items of equipment have been introduced; numbers of items offered for sale have increased from less than 100 in 1928 to about 6,000 in 1960; and many new food products and services are now provided to consumers.

III. Larger Investment

Next, a look at investment which shows another aspect of progress in the Bay State agricultural industry.

The average farm investment has increased about 10 times since 1900. It is now more than $35,000 per farm.

Part of this increase is due to higher prices. At the same time farms are larger. They require more equipment and livestock. Farmers are using the best land.

It takes an average investment in capital goods of almost $25,000 to provide a job on a modern Massachusetts farm. That's $5,000 more than in manufacturing.

There has been an increase in real terms of almost 50 per cent in the capital requirements per farm worker since 1950.

Incidentally, 98 per cent of Massachusetts farms are organized and operated as family enterprises. The farmer and his family supply more than half of the manpower on most farms.

In the retail food business, grocery store space has increased from an average of about 800 square feet in the 1920's to over 17,000 square feet in 1958. Investment in store equipment and fixtures has gone from an average of $2,000 per store to over $250,000 per store in about 40 years. All of these changes are similar to those that have taken place in agricultural production.

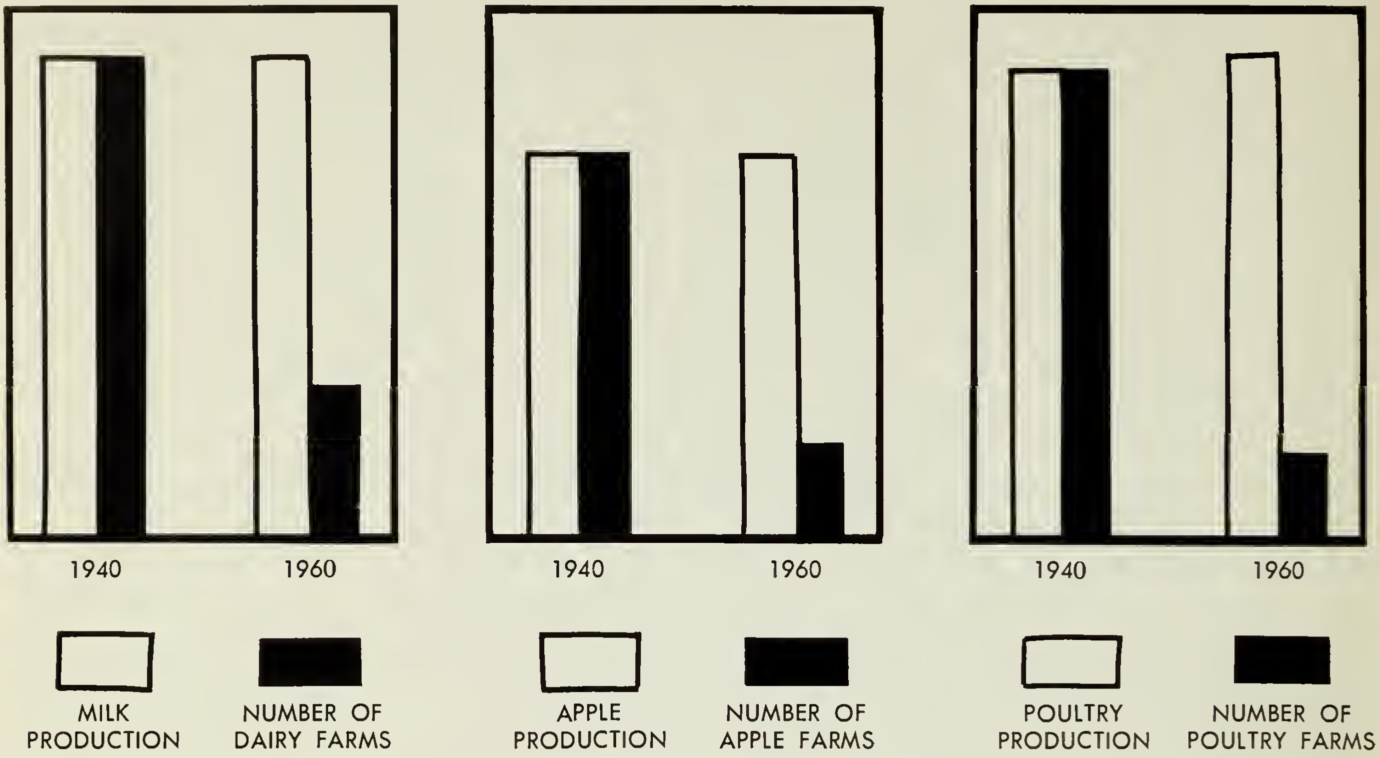
IV. Labor Requirements

Mechanization has made farming more intensive, but the over-all labor requirements have declined.

For example, milk production per cow has increased 75 per cent during the past 30 years; and on the average, milk production per crop acre on specialized dairy farms has more than doubled. During this period, milk production per hour of labor has more than doubled.

INCREASING EFFICIENCY OF MASSACHUSETTS AGRICULTURE

Comparison Of Total Production and Number Of Farms, 1940 and 1960,
For Milk, Apples, and Poultry; 1960 Figures Are Percentage of 1940 Figures



Source: Based On United States Census Figures and Commodity Surveys Made By Staff Members Of The Department of Agricultural and Food Economics.

V. Over-All Efficiency

Adding together the results of these developments shows that over-all efficiency on Massachusetts farms, in terms of what is produced per unit of input, has gone up about 25 per cent since 1950.

This has been accompanied by a trend to fewer but larger farm units. For example, during the past 20 years:

- The number of farms with dairy cattle has been reduced from 20,000 to less than 6,000.

  But the number of cows per farm has more than doubled; and total milk production has held steady.

- The number of poultry flocks has been reduced to a fifth.

  But the size of flocks has increased and production has gone up.

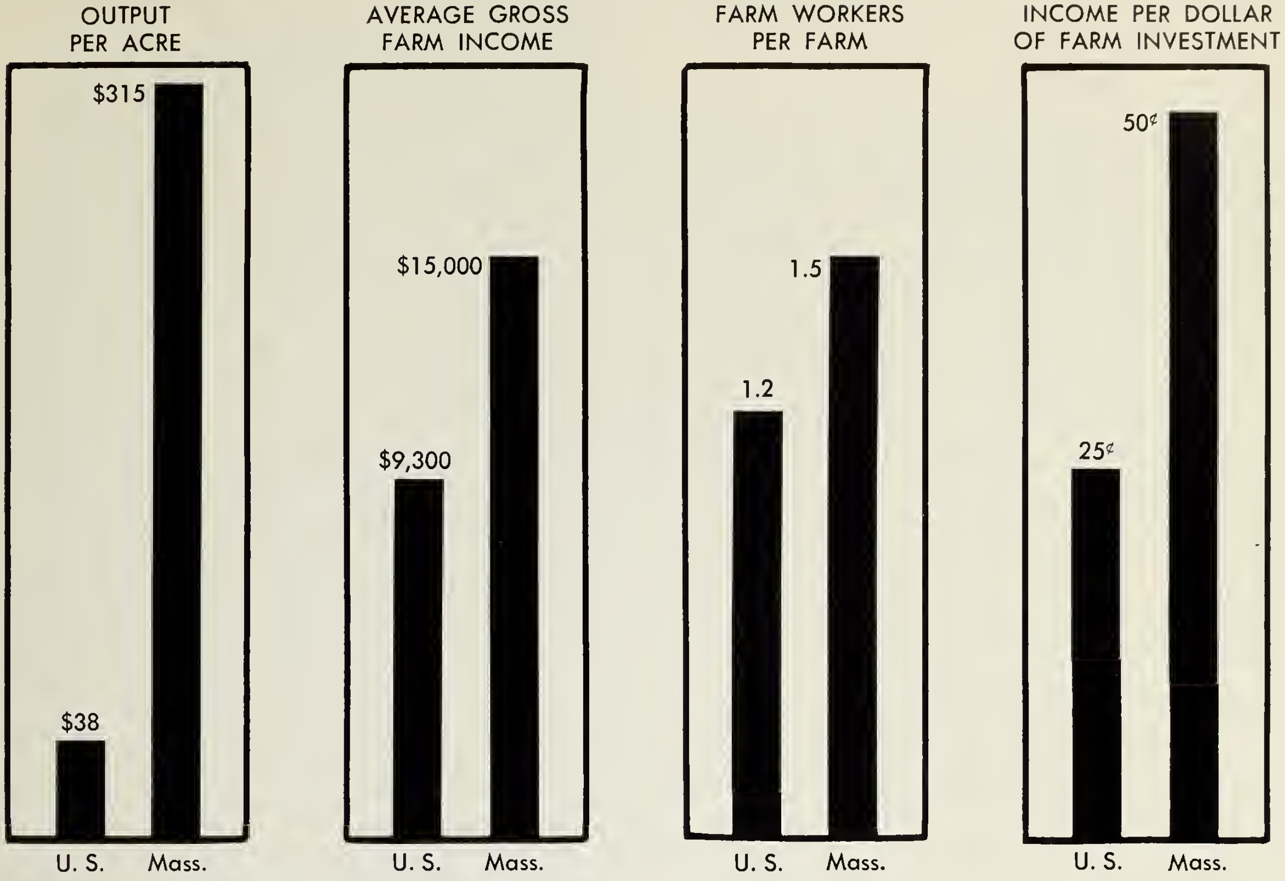
- The number of Massachusetts apple farms has been reduced from 1,600 to less than 400; and tree numbers have been reduced almost two-thirds.

  But the average size of orchards increased from 600 to more than 900 trees; and production of apples per tree increased enough to maintain the state's apple production.

Changes in food retailing have been as drastic as the changes in food production. About 220,000 retail grocery firms and specialty food retailers have gone out of business since the peak in numbers was reached in 1929. The many smaller stores have been replaced by fewer stores of larger size; and between 1929 and 1958 the grocery stores selling over $300,000 a year increased from 4% to 70%. There has been expansion in size, equipment, and number of items sold; a shift to one-stop food stores; and a general spread of self-service. Tied closely to these developments are great improvements in food handling, packaging, transportation, storage and distribution methods.

The entire agricultural industry has shown increased size of plants and firms, and increased efficiency.

MASSACHUSETTS AND UNITED STATES COMPARISONS SHOW LEADING POSITION OF STATE'S AGRICULTURE



Source: Tabulations From "Farm Income Situation", United States Department of Agriculture; and "United States Agricultural Census", United States Department of Commerce, 1959.

MASSACHUSETTS AGRICULTURAL INDUSTRY LEADS THE WAY

The high level of output and the high degree of specialization of today's agriculture in Massachusetts are not exceeded anywhere in the world — in spite of the fact that Bay State agriculture is small in terms of number of farms.

It has reached this stage as a result of successful adjustment to the continuous changes in our economy over the past 300 years.

Commercial farming in Massachusetts is a model of the agriculture of the future for many parts of the United States where the processes of urbanization and industrialization have not yet developed to the degree they have here.

In its intensity, Massachusetts agriculture may also be a model for the agricultural system we will need to feed the American people in the future.

Comparisons Show Massachusetts' Lead

Some significant comparisons with other areas show the advanced and intensified stage to which the agriculture of Massachusetts has progressed.

Gross farm income in Massachusetts averages $15,000 per farm, compared with $9,300 for the United States.

Higher yields per acre, higher milk production per cow, higher egg production per hen are all evidences of Massachusetts as a pioneer and leader of the country in production efficiency.

The annual gross farm income per dollar of farm investment is 50 cents in Massachusetts, compared with less than 25 cents for the country as a whole — in spite of the fact that farm investment for Massachusetts farms is just about the same as for the United States.

There are 1.5 farm workers per farm, compared with the United States figure of 1.2 — and we lead in spite of the fact that our farm units are smaller in acres than the farm units for the country as a whole.

The value of farm output per acre of open land used in farming is $315 in Massachusetts, compared with only $38 for the United States. Incidentally, it averages $101 for California and $84 for Iowa, both often considered the nation's leading agricultural states.

Massachusetts provides 17 per cent of the food needed by our five million residents. It produces half the nation's cranberry crop. Along with Connecticut, it produces two-thirds of the nation's shade-grown cigar-wrapper tobacco. Massachusetts, with the rest of New England, is the only major apple-growing region in the United States where production is increasing. Production of flowers and nursery products is increasing; and production of maple sugar, Christmas trees, and lumber is being maintained.

Our low proportion of tenant-operated farms is another indication of the excellent state of health of our agriculture. In Massachusetts, three per cent of all farms are tenant-operated. For the United States as a whole, the average is 20.5 per cent.

The tractor is symbolic of the mechanization that has increased greatly the efficiency of the Massachusetts agricultural industry.

Massachusetts-produced agricultural products are transported to a variety of marketing outlets.

One For Forty-Seven

The great technological advance of American agriculture can be shown graphically by the phenomenal increase in numbers of people who can be served by the production of one farmer.

A century ago, one United States farm worker produced enough food and fiber for himself and 4 other people. In 1900, it was 6.9 other people. In 1940, it was 10.6.

Today, one United States farm worker produces enough for himself and 25 others.

In Massachusetts, where agriculture is at an advanced state of intensity, *one farm worker produces enough for himself and 47 other people.*

AGRICULTURAL PROGRESS HAS BEEN OF BENEFIT TO ALL

Continued scientific progress is important to all phases of the Massachusetts agricultural industry — both on and off the farm. It is especially important for consumers.

Residents of the Bay State have much to gain from high living standards which result from efficient production and distribution of our farm and forest products.

We Are Eating Better

We are spending a smaller proportion of our income for food, but we are eating better and enjoying more services and conveniences.

Satisfied consumers in Bay State eating places enjoy the benefits of progress in the agricultural industry.

Today's food expenditures bring us a greater proportion of the higher-quality items such as fruits, vegetables, steaks, poultry, and dairy products.

On a per person basis, we are eating substantially more of these foods than people did 20 to 25 years ago.

Also, we get more conveniences with the food we buy — services such as processed foods in labor-saving packages, ready-mixes, frozen ready-to-serve foods, concentrates and dehydrated foods, and even heat-and-serve dishes.

INCREASES IN PER CAPITA CONSUMPTION
OF MEAT, POULTRY, AND DAIRY PRODUCTS

Food Item	1935-1939	1960
Meat	127 lbs.	160 lbs.
Poultry	16 lbs.	34 lbs.
Dairy Products	393 lbs.	428 lbs.

Source: "Background On Our Nation's Agriculture", Leaflet No. 491, United States Department of Agriculture.

Thousands of items are available for consumer selection in retail food stores.

What Do We Spend For Food?

Only 20 per cent of our take-home pay went for food in 1960. It took 27 per cent in 1947.

The real cost of our food is lower than it has ever been. One hour's work in a factory buys more food today than ever before.

The chart below shows six food items which reflect the dramatic effect of increasing agricultural efficiency on our living costs and standards.

AMOUNT OF FOOD PURCHASED
WITH ONE HOUR'S WORK

Comparisons For 1930 and 1960
Of Selected Food Items

Food	Unit	1930	1960
Bacon	pounds	1.3	2.7
Bread	loaves	6.4	11.0
Butter	pounds	1.0	2.9
Eggs	dozens	1.1	3.5
Milk	quarts	4.0	9.0
Steaks	pounds	1.2	2.0

Source: "Background On Our Nation's Agriculture", Leaflet No. 491, United States Department of Agriculture.

Massachusetts Milk and Broilers Are Good Examples

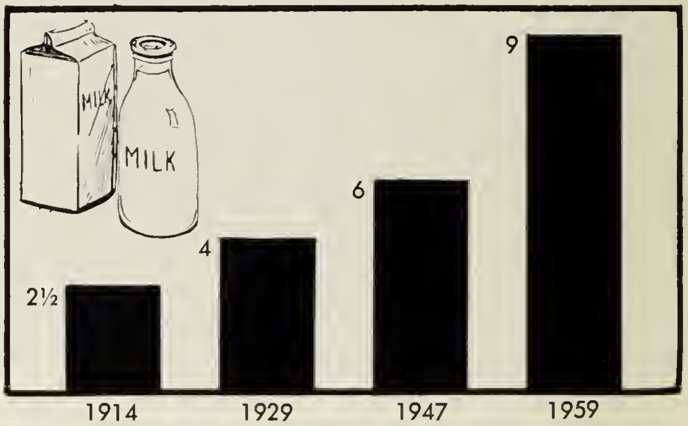
Two Massachusetts-produced agricultural products — milk and broilers — illustrate very well how Bay State consumers have benefited from the increased efficiency of our agriculture.

Milk — In 1914, one hour's work would buy 2.5 quarts of milk. In 1929, it would buy 4 quarts; in 1947, 6 quarts; and in 1959, 9 quarts.

Broilers — In 1950, one hour's work would buy 2.5 pounds of broilers. In 1956, it would buy 4 pounds; and in 1960, 5 pounds.

QUARTS OF MILK PURCHASED BY ONE HOUR'S LABOR

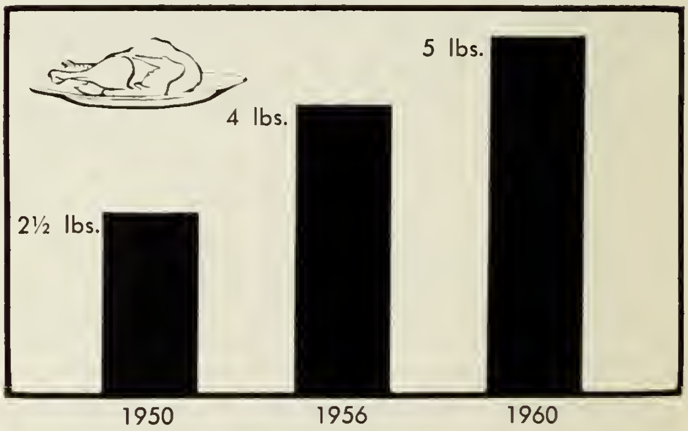
Comparisons For the Years 1914, 1929, 1947, and 1959



Source: "Food For A Nation" and "Outlook Reports", United States Department of Agriculture, 1959.

POUNDS OF BROILERS PRODUCED
BY ONE HOUR'S LABOR

Comparisons For the Years 1950, 1956, and 1960



Source: "Food For A Nation" and "Outlook Reports", United States Department of Agriculture, 1959.

Thus, the present-day diet of consumers is a testimony to the continuing efficiency of our agricultural industry in producing and distributing more, better, and less costly food which contributes to the better health and well-being of the people of our state and nation.

Machinery has made possible large-scale enterprises and increased the efficiency of labor.

Many people, such as this retail store employee, perform important jobs in providing food to Massachusetts consumers.

Massachusetts agricultural products include trees, shrubs, flowers, forest products, and tobacco in addition to food.

Where We Stand Today

The agricultural industry of Massachusetts — the major part of which includes suppliers, farmers, processors, and distributors of food — occupies a vital place in the Commonwealth.

- It is a major factor in the state's economy.
- It is an industry which has changed to keep abreast of the times.
- It is a leader for the rest of the country and the world.
- It is food supply insurance against disaster in these troubled times.

The Massachusetts agricultural industry is a customer for enormous amounts of supplies and services, produces much needed food, creates jobs and payrolls, and contributes much to the economic well-being of the state.

It has adjusted to technological innovation and to economic and social changes. Its efficiency has increased. Its production has been maintained. It is a strong factor in Massachusetts' business.

The agricultural industry is important to every citizen of Massachusetts. Its progress and successful development will continue to provide beneficial results for all.

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